Writing Your Application

Introduction

Writing a grant application is a major undertaking. The following guidance may assist you in developing a strong application that allows reviewers to better evaluate the science and merit of your application.

- Though the advice provided is relevant for all research grants, it is general in nature and geared toward the NIH Research Project (R01).
- The tips and guidelines included in this document are not intended to replace your organization’s internal guidance, specific advice provided by NIH program or grants management staff, or instructions found in the various application guides.
- This document is written for the Investigator. Therefore, all references to “you” refer to the Program Director/Principal Investigator (PD/PI).

Get Prepared

To ensure efficient and thorough completion of your application, consider taking the following preliminary steps:

- Review the grant application instructions for important information on the application process and guidance on preparing specific sections of the application.
- Carefully read the funding opportunity announcement (FOA) for any special instructions.
- Solicit feedback from colleagues and/or mentors on your research idea while it is still in the concept state.
- Prepare an outline following the application framework and structure described in the application guide.
- Make sure you have adequate preliminary data.
- Develop a feasible timeline with draft application deadlines. Be realistic about the time it can take to write and revise the application.
- Ask your colleagues or your Office of Sponsored Research for copies of successfully completed NIH grant applications. Examine them closely.
- Contact someone in your institution who can assist you in understanding and completing application materials.
- Make sure that your institution will allow you enough time to accomplish the research, if funded.
- Become familiar with the NIH peer review criteria; reviewers will use them to rate your application.

Is Your Idea Original?

- Check the literature to verify that the exact project you are considering has not been done before. Search the literature and the NIH RePORTER database to minimize overlap with similar studies.
- Assess the competition. See which other projects in your field are being funded, and consider turning competitors into collaborators to improve the strength of your proposal.
- Carve out a niche that will allow you to significantly advance knowledge in your respective field.
Refine Your Ideas

- Generate a hypothesis.
- Make sure your specific research aims can be accomplished within the proposed time and resources.
- Discuss your research idea with colleagues, mentors, etc. Request that they review a first draft of your specific aims early in the process. This step can save lots of valuable time.
- Confirm your confidence and enthusiasm for the proposed research. Propose research that you are passionate about and totally committed to doing.

**INSIDER TIP:** Secure a mentor(s) who can provide advice and guidance on developing and writing a successful grant application. Secure a collaborator(s) on your project who can provide any scientific expertise you may lack.

What to Know Before You Start Writing the Research Proposal

Careful preparation saves time, resources and will help you build a solid application. A panel of experts reviews all grant applications submitted to the NIH in a process known as peer review. Although several factors contribute to whether your application will be funded, great emphasis is placed on this evaluation and how the reviewers rate the scientific merit of your proposal. The following sections describe the criteria reviewers employ to evaluate applications. Read them carefully for helpful hints on the information and content you should include in the application to garner a favorable evaluation.

In addition, tips have been provided for demonstrating to reviewers and NIH staff the high quality of the personnel involved, available research resources, and the applicant institution's support of the project. Special instructions for new investigators and foreign applicants are provided, as well.

**NIH Peer Review Criteria**

The goals of NIH-supported research are to advance our understanding of biological systems, to improve the control of disease, and to enhance health. In their written critiques, reviewers will comment on each of the following criteria to evaluate the likelihood that the proposed research will have a substantial impact on the pursuit of one or more of these goals. The overall score is assigned based on the reviews for each of these criteria. Reviewers are instructed to keep the five review criteria in mind; however, the final priority score they assign is more likely to reflect a judgment of overall merit.

**NOTE:** These are general review criteria for evaluating unsolicited research project grant applications. NRSA fellowship award, career development award, and specific funding opportunity announcements (FOAs) may have different or additional special review criteria. Applicants should familiarize themselves with the review criteria by which their application will be evaluated.
1. **Significance.** Does the project address an important problem or a critical barrier to progress in the field? If the aims of the project are achieved, how will scientific knowledge, technical capability, and/or clinical practice be improved? How will successful completion of the aims change the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field?

2. **Investigator(s).** Are the PD/PIs, collaborators, and other researchers well suited to the project? If Early Stage Investigators or New Investigators, or in the early stages of independent careers, do they have appropriate experience and training? If established, have they demonstrated an ongoing record of accomplishments that have advanced their field(s)? If the project is collaborative or multi-PD/PI, do the investigators have complementary and integrated expertise; are their leadership approach, governance and organizational structure appropriate for the project?

3. **Innovation.** Does the application challenge and seek to shift current research or clinical practice paradigms by utilizing novel theoretical concepts, approaches or methodologies, instrumentation, or interventions? Are the concepts, approaches or methodologies, instrumentation, or interventions novel to one field of research or novel in a broad sense? Is a refinement, improvement, or new application of theoretical concepts, approaches or methodologies, instrumentation, or interventions proposed?

4. **Approach.** Are the overall strategy, methodology, and analyses well-reasoned and appropriate to accomplish the specific aims of the project? Are potential problems, alternative strategies, and benchmarks for success presented? If the project is in the early stages of development, will the strategy establish feasibility and will particularly risky aspects be managed? If the project involves clinical research, are the plans for 1) protection of human subjects from research risks, and 2) inclusion of minorities and members of both sexes/genders, as well as the inclusion of children, justified in terms of the scientific goals and research strategy proposed?

5. **Environment.** Will the scientific environment in which the work will be done contribute to the probability of success? Are the institutional support, equipment and other physical resources available to the investigators adequate for the project proposed? Will the project benefit from unique features of the scientific environment, subject populations, or collaborative arrangements?

**Additional Review Criteria.** As applicable for the project proposed, reviewers will consider the following additional items in the determination of scientific and technical merit, but will not give separate scores for these items.

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<th>Protections for Human Subjects</th>
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<td>Inclusion of Women,</td>
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**Additional Review Considerations.** As applicable for the project proposed, reviewers will address each of the following items, but will not give scores for these items and should not consider them in providing an overall impact/priority score.

Applications from Foreign Organizations
Select Agent
Resource Sharing Plans
Budget and Period Support
For more details regarding the scoring system, see the OER Peer Review Process Web page.

NOTE: Certain funding opportunity announcements (FOAs) that are published in the NIH Guide for Grants and Contracts may list additional elements under each of the above criteria related to the specific requirement of the RFA.

**Independence, Resources and Institutional Support**

Sufficient information must be included to demonstrate to reviewers and NIH staff the high quality of the PD/PI, the co-investigators, available research resources, and the applicant institution and its support of the project. When possible, include letters of commitment for resources, such as particular pieces of equipment or lab space, or letters from collaborators stating their willingness to participate in the research.

**Independence:**

- For Early Stage Investigators or New Investigators, or those who are in the early stages of independent careers, it is important to provide the reviewers evidence that you have the appropriate experience and training for the size and scope of the project.
  - Note, there are several programs offered by the NIH specifically for Early Stage or New Investigators which may be of interest. For more information, see the home page for New and Early Stage Investigator policies and programs.

**Resources:**

- Understand the level of resources needed to compete.
- Conduct an organizational assessment. Determine what resources and support your organization has and what additional support you'll need.
- Consider whether the available equipment and facilities are adequate and whether the environment is conducive to the research.
- Applicants should clearly state that they have the appropriate resources to conduct the research, such as adequate equipment and laboratory space.

**Institutional Support:**

- Letters of reference and institutional commitment are important.
- Mention any start-up funds, support for a technician, etc. This is a positive indicator of institutional commitment to the peer reviewers.

**Collaborators**

Determine the expertise needed for your research study team (individuals, collaborating organizations, resources, etc.). Most scientific work requires collaboration among researchers, and NIH is dedicated to fostering such relationships.

- Letters of commitment in your application should clearly spell out the roles of the collaborators. The grant application should contain a signed letter from each
collaborator to the applicant that lists the contribution he or she intends to make and his or her commitment to the work. These letters are often the primary assurance the reviewers have that this work will in fact be done.

- For consultants, letters should include rate/charge for consulting services.
- If you are planning to use the multiple-PI model, then take the following into consideration:
  - The format, peer review and administration of applications submitted under the multiple-PI model do have some significant differences from the traditional single-PI model. Therefore, it is essential to consider all aspects of the funding mechanism before submitting an application, regardless of the type of research proposal to be submitted.
  - All applicants proposing team science efforts are strongly encouraged to contact their NIH program officials at the earliest possible date to discuss the appropriateness of the multiple-PI model for the support of their research.

**INSIDER TIP:** Reviewers with expertise in your area will best recognize the potential for your research to advance science. Applicants may request particular study sections (and even a particular IC) in a cover letter submitted with the application. The letter is stored in a separate location and not forwarded to reviewers. Review the rosters of the scientific review groups to get your application assigned to a study section where some members have the appropriate expertise to review your project. This is an opportunity to also provide names of any reviewers that may have a conflict of interest and should not be considered as reviewers of your application. It is important to match your area of research with the areas reviewed by the study section.

**Are You a New or Early Stage Investigator?**

- Determine whether you qualify as a new investigator based on the NIH definition of new investigator. NIH offers funding opportunities tailored to new investigators, such as the NIH Director’s New Innovator Award. More information on NIH programs designed for new investigators can be found on the New Investigators Program Web page.

- NIH staff is on the lookout for new and early stage investigators. Check your eRA Commons account and ensure your funding history and the date of your residency or terminal degree are accurate to ensure that you are identified appropriately as a new or early stage investigator. The eRA system calculates eligibility based on the information associated with the applicant’s PD/PI profile and account.

- It is to your advantage to identify yourself as a new investigator because reviewers are instructed to give special consideration to new investigators. Reviewers will give greater consideration to the proposed approach, rather than the track record.

- First-time applicants may have less preliminary data and fewer publications than more seasoned investigators, and NIH reviewers understand this. Reviewers instead place more emphasis on how the investigator has demonstrated that he or she is truly independent of any former mentors, whether he or she has some of his or her own resources and institutional support, and whether he or she is able to independently lead the research.
Foreign Involvement – Institution and/or Investigator

- Foreign PD/PIs and those from foreign institutions are highly encouraged to check the eligibility guidelines provided in every FOA.

- The appropriate checkbox on the PHS 398 Grant Application should be marked if the application is being submitted by a domestic institution with a foreign component or if your institution is overseas.

- There are specific requirements and guidelines for research involving foreign institutions that will need to be considered when planning and writing an NIH application (e.g. categorical budgets only, special select agents requirements, etc.)

- Foreign PD/PI’s and those from foreign institutions are highly encouraged to contact an NIH NIH program officer as soon as possible in the planning and writing stages.

Developing Your Research Plan

The research plan describes the proposed research, stating its significance and how it will be conducted. Remember, your application has two audiences: the majority of reviewers who will probably not be familiar with your techniques or field and a smaller number who will be familiar.

- All reviewers are important to you because each reviewer gets one vote.
- To succeed in peer review, you must win over the assigned reviewers. They act as your advocates in guiding the review panel's discussion of your application.
- Write and organize your application so the primary reviewer can readily grasp and explain what you are proposing and advocate for your application.

INSIDER TIP: Appeal to the reviewers and the funding ICs by using language that stresses the significance of your proposed work.

BECAUSE THE DETAILS OF DEVELOPING A RESEARCH PLAN ARE OFTEN VERY SPECIFIC TO THE GUIDELINES OF THE EXACT FUNDING MECHANISM, YOU SHOULD CONSULT THE APPROPRIATE PROGRAM ANNOUNCEMENT FOR ADDITIONAL DETAILS.

REMEMBER...

Be sure to carefully read all instructions in the application and application guide to make sure the submission process is successful and that consideration of your application is not delayed.

Additional Elements Required in a Grant Application

The following elements need to be included in the grant application as appropriate. Unless stated, these elements do not influence the rating (priority score) of the application. However, the reviewers are asked to comment on the adequacy of the information provided for each element. Any concerns the reviewers identify may negatively affect and postpone the granting of an award.
• **Appendix Materials**  
The Appendix may not be used to circumvent the page limitations of the Research Plan. Essential information should be included within the body of the grant application. The appendices should contain supportive or supplemental information.

• **Bibliography & References Cited (formerly “Literature Cited”)**  
Provide a bibliography of any references cited in the Research Plan. Each reference must include the names of all authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume number, page numbers, and year of publication. Make sure that only bibliographic citations are included. Be especially careful to follow scholarly practices in providing citations for source materials relied upon when preparing any section of the application. Note the location of this information is slightly different in the SF424 R&R and the PHS398. Please read the application instructions carefully for whichever application you are using.

• **Care and Use of Vertebrate Animals in Research**  
If you are planning to use live vertebrate animals in the project, you must adhere to the requirements in the *Public Health Service (PHS) Policy*: [HTML Version](#) and [PDF Version](##). The PHS Policy is summarized in the brochure *What Investigators Need to Know About the Use of Animals*. Additional information can be found at:  
  o [Office of Laboratory Animal Welfare Web Site](#)  
  o NIAID's tutorial: [Requirement for Grantees Using Research Animals](#)

• **Consortium/Contractual Arrangements**  
Explain the programmatic, fiscal, and administrative arrangements to be made between the applicant organization and the consortium organization(s).

• **Consultants**  
Attach appropriate letters from all consultants confirming their roles in the project. For consultants, letters should include rate/charge for consulting services.

• **Facilities & Other Resources**  
This information is used to assess the capability of the organizational resources available to perform the effort proposed. Identify the facilities to be used (Laboratory, Animal, Computer, Office, Clinical and Other). If appropriate, indicate their capacities, pertinent capabilities, relative proximity and extent of availability to the project. Describe only those resources that are directly applicable to the proposed work.

• **Inclusion of Women, Minorities and Children in Research**  
Peer reviewers will also assess the adequacy of plans to include subjects from both genders, all racial and ethnic groups (and subgroups), and children, as appropriate, for the scientific goals of the research will be assessed. Plans for the recruitment and retention of subjects will also be evaluated.

• **Protection of Human Subjects from Research Risk**  
Applicants must assure NIH that all human subjects are protected. Reviewers will assess the potential risk to human subjects in proposed research and evaluate what protections are in place to guard against any research-related risk. Awards cannot be made until assurances are on file with the [Office for Human Research Protections](#) (OHRP). Decision charts are presented that are helpful in thinking through relevant human subject protections issues (see [http://www.hhs.gov/ohrp/policy/checklists/decisioncharts.html](http://www.hhs.gov/ohrp/policy/checklists/decisioncharts.html)).

• **Resource Sharing Plan(s)**  
This section includes Data Sharing Plan, when applicable, and Sharing Model Organisms. For more information on data sharing, please see the NIH website  

• **Select Agents**  
Identify any select agents to be used in the proposed research. Select agents are hazardous biological agents and toxins that HHS or USDA have identified as having the potential to pose a severe threat to public health and safety, to animal and plant health, or to animal and plant products. CDC maintains a list of [HHS and USDA Select Agents and Toxins](#).
• **Multiple PD/PI**
  For applications designating multiple PDs/Pis, you must include a leadership plan.

• **Use of Internet Sites**
  NIH instituted a policy that prohibits the use of World Wide Web addresses (URLs) in grant applications in the place of text describing the same material. This is because of the potential for providing a large amount of extra material from a web site beyond what would fit in the page limit, and thereby giving an unfair advantage to some applicants and a large additional burden for reviewers.

**Important Writing Tips**

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<th>NIH encourages applicants to describe their research in terms that are easily understood by peer reviewers, scientists, Congress, and the public.</th>
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<tr>
<td><strong>Titles, abstracts and statements of public health relevance should:</strong></td>
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<tr>
<td>1. Convey the value of the research in plain language – clear, succinct, and professional</td>
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<td>2. Be comprehensible to both scientists and the public</td>
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<td>3. Relay the potential impact of the research on health</td>
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For more information and writing examples, see Communicating Research Intent and Value in NIH Applications.

• The instructions require that materials be organized in a particular format. Reviewers are accustomed to finding information in specific sections of the application. Organize your application to effortlessly guide reviewers through it. This creates an efficient evaluation process and saves reviewers from hunting for required information.

• Think like a reviewer. A reviewer must often read 10 to 15 applications in great detail and form an opinion about each of them. Your application has a better chance at being successful, if it is easy to read and follows the usual format. Make a good impression by submitting a clear, well-written, properly organized application.

• Start with an outline following the suggested organization of the application.

• Be complete and include all pertinent information.

• Be organized and logical. The thought process of the application should be easy to follow. The parts of the application should fit together.

• Write one sentence summarizing the topic sentence of each main section. Do the same for each main point in the outline.

• Make one point in each paragraph. This is key for readability. Keep sentences to 20 words or less. Write simple, clear sentences.

• Before you start writing the application, think about the budget and how it is related to your research plan. Remember that everything in the budget must be justified by the work you've proposed to do.

• Be realistic. Don't propose more work than can be reasonably done during the proposed project period. Make sure that the personnel have appropriate scientific expertise and training. Make sure that the budget is reasonable and well-justified.

• Capture the reviewers' attention by making the case for why NIH should fund your research. Tell reviewers why testing your hypothesis is worth NIH's money, why you are the person to do it, and how your institution can give you the support you'll need to get it done. Be persuasive.
Include enough background information to enable an intelligent reader to understand your proposed work.

Although though not a requirement for assignment purposes, a cover letter can help the Division of Receipt and Referral in the Center for Scientific Review assign your application for initial peer review and to an IC for possible funding.

Use the active, rather than passive, voice. For example, write "We will develop an experiment," not "An experiment will be developed."

Use a clear and concise writing style so that a non-expert may understand the proposed research. Make your points as directly as possible. Use basic English, avoiding jargon or excessive language. Be consistent with terms, references and writing style.

Spell out all acronyms on first reference.

Be sure to follow all stated guidelines and conventions regarding font, margins, line spacing, section labeling etc. These do matter and can be grounds for lowering your score!

Use sub-headings, short paragraphs, and other techniques to make the application as easy to navigate as possible. Be specific and informative, and avoid redundancies.

Use diagrams, figures and tables, and include appropriate legends, to assist the reviewers to understand complex information. These should complement the text and be appropriately inserted. Make sure the figures and labels are readable in the size they will appear in the application.

Use bullets and numbered lists for effective organization. Indents and bold print add readability. Bolding highlights key concepts and allows reviewers to scan the pages and retrieve information quickly. Do not use headers or footers.

Identify weak links in your application so the application you submit is solid, making a strong case for your project.

If writing is not your forte, seek help!

**Proofreading and Final Edits**

Allow sufficient time to put the completed application aside, and then edit it from a fresh vantage point. Try proofreading by reading the application aloud.

Allow time for an internal review by collaborators, colleagues, mentors and make revisions/edits from that review. If possible, have both experts in your field and those who are less familiar with your science provide feedback. The application should be easy to understand by all.

It is a good idea to have an independent expert provide an objective critique of your application. If possible, arrange for neutral third-party reviewers.

If more than one investigator is contributing to the writing, it would be helpful to have one overall editor.

Have zero tolerance for typographical errors, misspellings, grammatical mistakes or sloppy formatting. A sloppy or disorganized application may lead the reviewers to conclude that your research may be conducted in the same manner.

Prior to submission, perform a final proofread of the entire grant application.

**INSIDER TIP!** How would you rate your application? Once you've finished your application, conduct your own review based on the NIH's five peer review criteria. *Good Luck!*